



QUALYS SECURITY CONFERENCE 2019

# Moving Security up the Stack: Web Application and API Security

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# Agenda

Recent trends in Application Security

Web Application Scanning (WAS)

Qualys Periscope

Building Securing APIs

# Trends in Application Security

Web app breaches continue

E-commerce sites targeted

API attacks

Trends in AppSec testing

Shifting left

Coverage

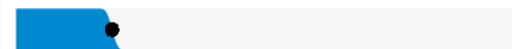
Automation

## Breaches

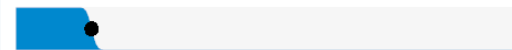
Web Applications



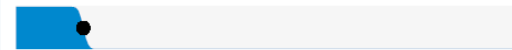
Miscellaneous Errors



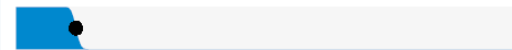
Privilege Misuse



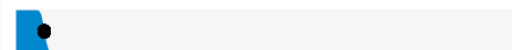
Cyber-Espionage



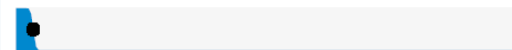
Everything Else



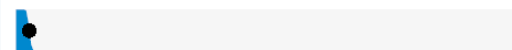
Crimeware



Lost and Stolen Assets



Point of Sale



Source: 2019 Verizon  
DBIR

The background is a solid blue color with a pattern of small white dots arranged in a grid. Three red circular highlights are placed on the grid: one in the upper right, one in the lower left, and one in the lower right.

# Web Application Scanning

# WAS Overview

Detects application-layer vulnerabilities in web apps & APIs

Browser engine

Automated crawling

Play back of Selenium scripts

API to integrate with other systems

Unique integration with Qualys WAF

Mature product



# 2019 Highlights

Custom scan intensity

WAS Jenkins plugin v2

Updated Qualys Browser Recorder

TLS 1.3

Full HTTP requests

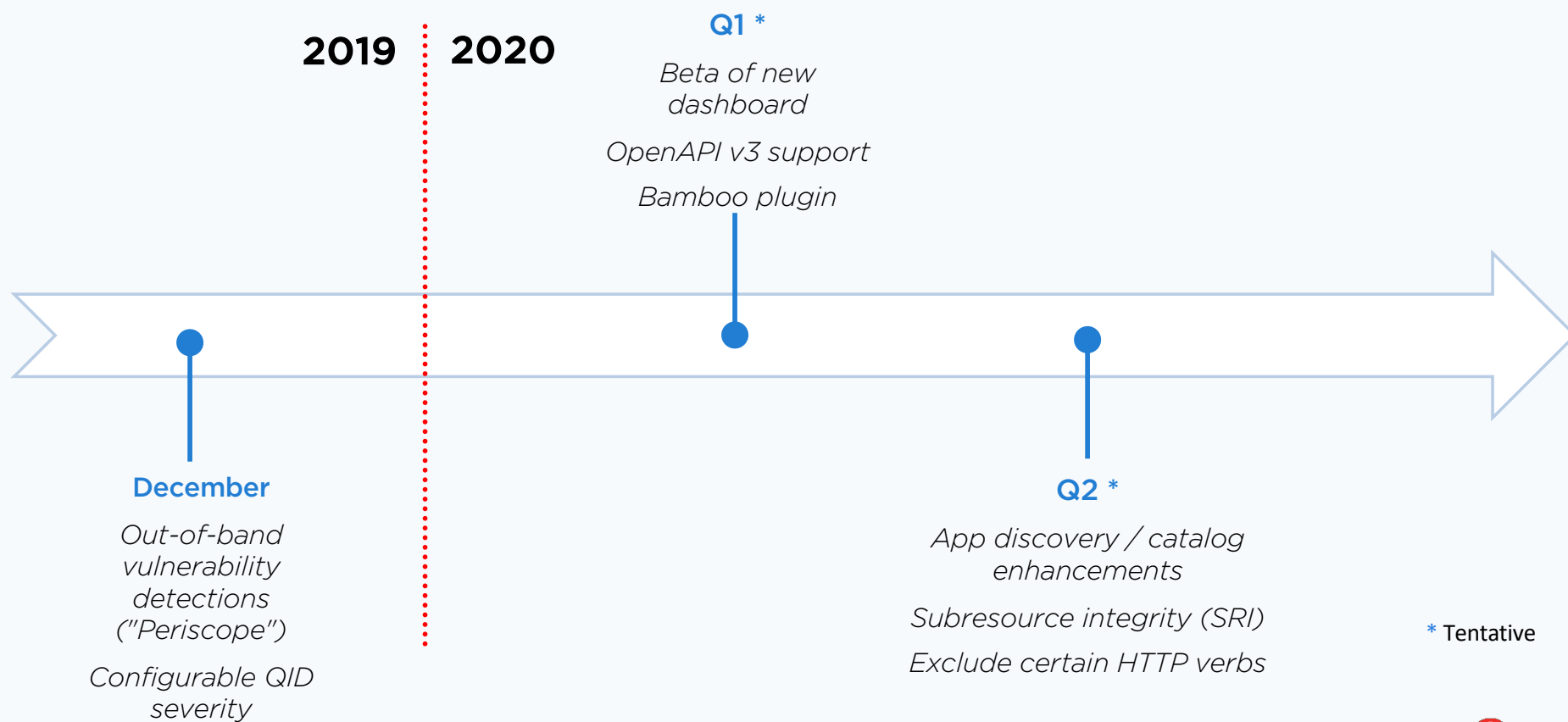
Enhanced crawling

Postman Collections

WAS Burp extension v2



# WAS Roadmap



\* Tentative

# Out-of-Band Vulnerabilities

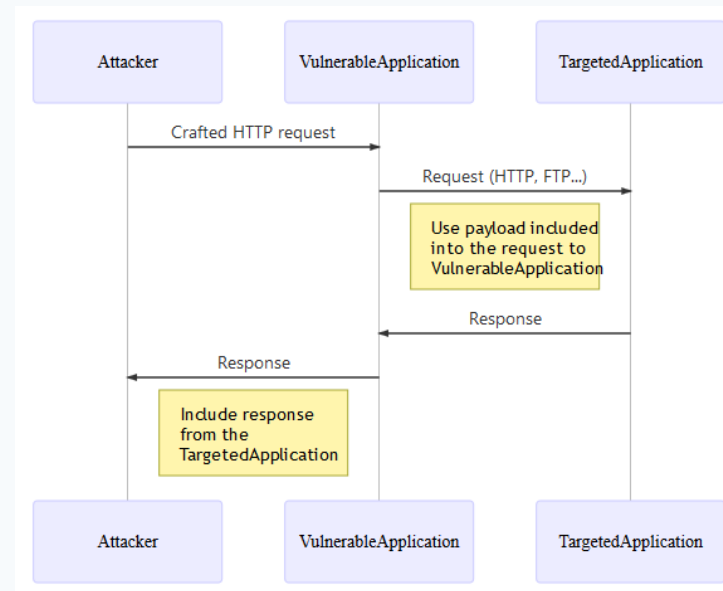
Some issues can't be detected by traditional request-response  
e.g.

SSRF

SMTP header injection

Blind XXE injection

Detecting these vulnerabilities  
requires a different approach



Source:  
OWASP



# Introducing Periscope

Detection mechanism for out-of-band web app vulnerabilities

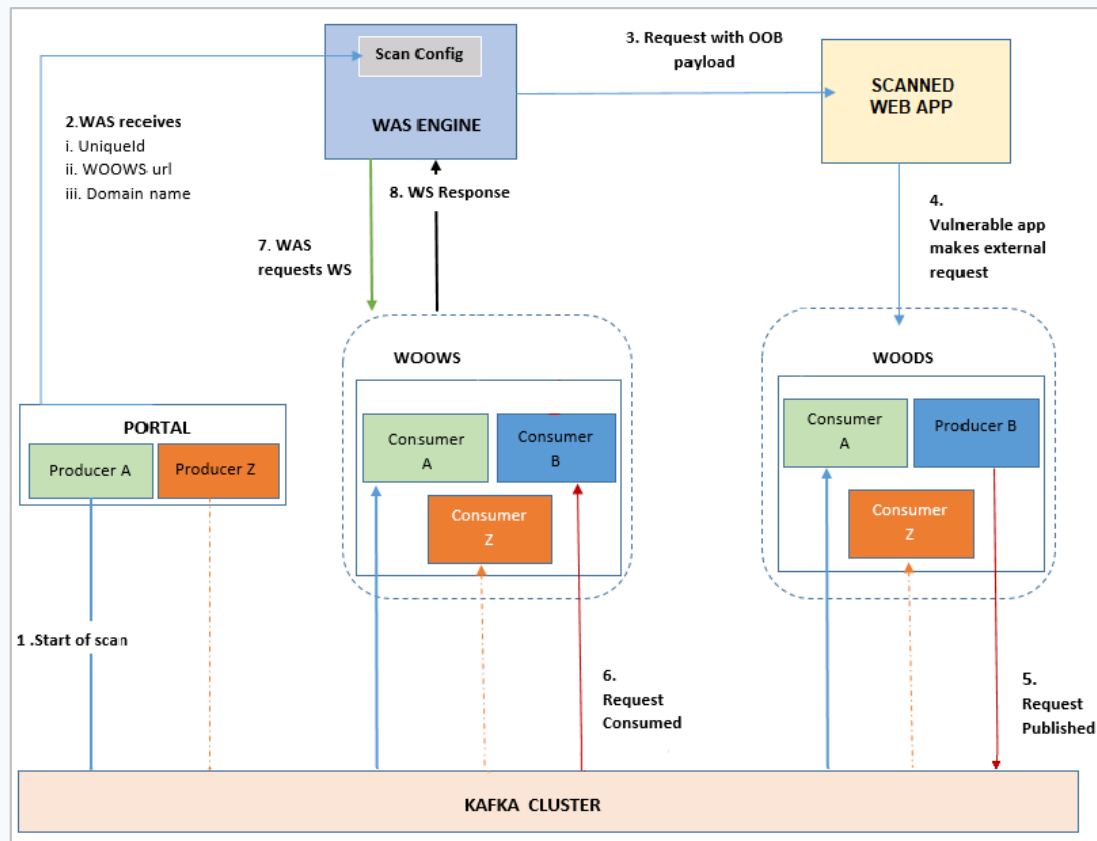
Scanner sends a test; POST request body is:

p1=joe&p2=smith&p3=http%3A%2F%2Fe528efddaa51766cb86afb19f22de54b6da1093c.1454156\_35626.2086421852.ssr01.ssr01.qualysperiscope.com

The web app tries to resolve this FQDN:

e528efddaa51766cb86afb19f22de54b6da1093c.1454156\_35626.2086421852.ssr01.ssr01.qualysperiscope.com

# Qualys Periscope



The background is a solid blue color with a pattern of small white dots arranged in a grid. Three red circular highlights are placed on the grid: one in the upper right, one in the lower left, and one in the lower right.

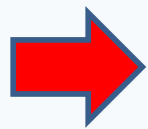
# Building Secure APIs

# OWASP API Security Top 10 (RC)



- |    |  |
|----|--|
| 1  | Broken Object Level Authorization (BOLA) |
| 2  | Broken Authentication                    |
| 3  | Excessive Data Exposure                  |
| 4  | Lack of Resources & Rate Limiting        |
| 5  | Broken Function Level Authorization      |
| 6  | Mass Assignment                          |
| 7  | Security Misconfiguration                |
| 8  | Injection                                |
| 9  | Improper Assets Management               |
| 10 | Insufficient Logging & Monitoring        |

# Example API – Pet Store



pet Everything about your Pets		
GET	/pet/{petId} Find pet by ID	🔒
POST	/pet/{petId} Updates a pet in the store with form data	🔒
DELETE	/pet/{petId} Deletes a pet	🔒
POST	/pet/{petId}/uploadImage uploads an image	🔒
POST	/pet Add a new pet to the store	🔒
PUT	/pet Update an existing pet	🔒
GET	/pet/findByStatus Finds Pets by status	🔒

# Relevant portion of the Swagger File

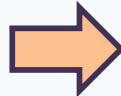
```
{
  "swagger": "2.0",
  "info": {
    "version": "1.0",
    "title": "Petstore",
  },
  "host": "api.petstore.com",
  "basePath": "/v1",
  "schemes": [
    "http", "https"
  ],
  "paths": {
    "/pet/{petId}": {
      "get": {
        "summary": "Get info for a specific pet",
        "operationId": "showPetById",
        "parameters": [
          {
            "name": "petId",
            "in": "path",
            "required": true,
            "description": "The ID of the pet to retrieve",
            "type": "integer"
          }
        ],
        "responses": {
          "200": {
            "description": "Expected successful response",
            "schema": {
              "$ref": "#/definitions/Pet"
            }
          }
        }
      }
    }
  }
}
```

...snip...

# How Does this Help with Security?

We can leverage the Swagger spec to harden the API endpoints in a declarative way

```
"paths": {
  "/pet/{petId}": {
    "get": {
      "summary": "Get info for a specific pet",
      "operationId": "showPetById",
      "parameters": [
        {
          "name": "petId",
          "in": "path",
          "required": true,
          "description": "The ID of the pet",
          "type": "integer"
        }
      ]
    }
  },
  ],
```



```
"paths": {
  "/pet/{petId}": {
    "get": {
      "summary": "Get info for a specific pet",
      "operationId": "showPetById",
      "parameters": [
        {
          "name": "petId",
          "in": "path",
          "required": true,
          "description": "The ID of the pet",
          "type": "integer",
          "minimum": 1,
          "maximum": 999999
        }
      ]
    }
  },
  ],
```

# Capabilities Coming to Qualys API Security

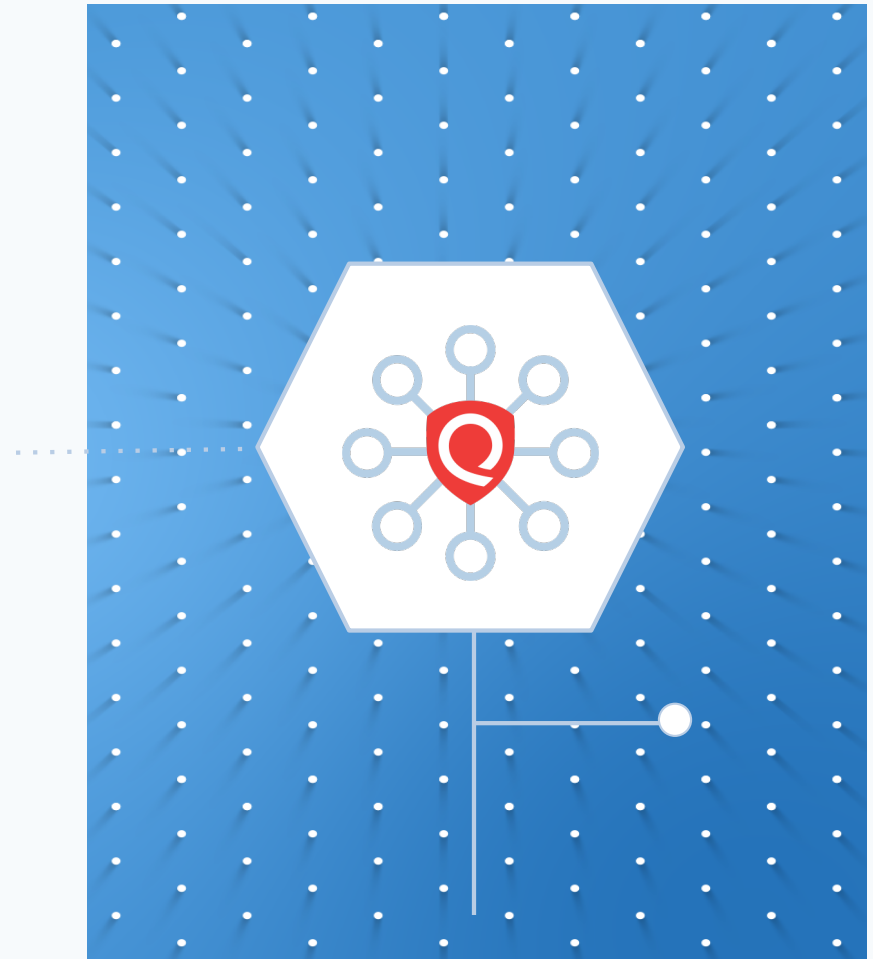
Static Assessment of Swagger/OpenAPI file  
Get recommended changes to harden your API

Conformance Scan to check the API's actual behavior

Test the API endpoints for behavior that violates the Swagger file

Vulnerability Scan to check the API for security flaws

Current feature in Qualys Web Application Scanning (WAS)







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# Thank You

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